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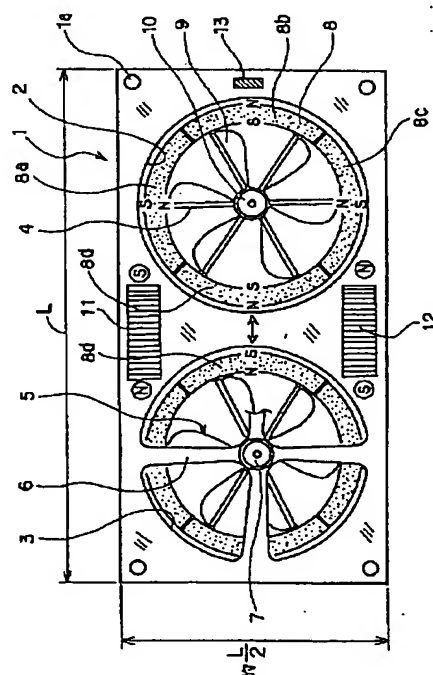
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(54) 【発明の名称】 送気用ファン装置

(57) 【要約】

【目的】 小さく設定した場合であっても、十分な風量を確保でき、かつ偏平に構成でき、しかも専用取付け金具なしで各種機器に取付け可能にできるようにして、従来の軸流ファンと略同様に扱うことができる送気用ファンの提供。

【構成】 第1の羽根体4と第2の羽根体5を回転自在に支持する軸支部7と、各羽根体の送気方向に開口した第1の開口部2と第2の開口部3とを有するファン本体部1と、回転中心軸10から外側に向けて形成される複数の羽根部9と、外周部位から円環状に形成される多極永久磁石8とから形成される第1の羽根体4と第2の羽根体5と、接線方向に略沿うように発生磁界方向が変化する磁界発生手段11、12とを具備する



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【特許請求の範囲】

【請求項1】 連続回転駆動される第1の羽根体と第2の羽根体とを一体的に併設してなる送気用ファン装置であって、

前記第1の羽根体と前記第2の羽根体を回転自在に支持する軸支部と、前記各羽根体の送気方向の前後部位においてそれぞれ開口した第1の開口部と第2の開口部とを有するファン本体部と、

前記軸支部により軸支される回転中心軸から外側に向けて形成される複数の羽根部と、該羽根部の外周部位から円環状に形成されるとともに、等角度で複数の羽根部に分割されてラジアル方向に極性を相互に違えて着磁された多極永久磁石とから形成される前記第1の羽根体と前記第2の羽根体と、

前記第1の羽根体の外周面と前記第2の羽根体の外周面の接線方向に略沿うように発生磁界方向が変化する磁界発生手段と、

を具備することを特徴とする送気用ファン装置。

【請求項2】 連続回転駆動される第1の羽根体と第2の羽根体とを一体的に併設してなる送気用ファン装置であって、

前記第1の羽根体と前記第2の羽根体を回転自在に支持する軸支部と、前記各羽根体の送気方向の前後部位においてそれぞれ開口した第1の開口部と第2の開口部とを有するファン本体部と、

前記軸支部により軸支される回転中心軸から外側に向けて形成される複数の羽根部と、該羽根部の外周部位から円環状に形成されるとともに、等角度で複数の羽根部に分割されてラジアル方向に極性を相互に違えて着磁された多極永久磁石とから形成される前記第1の羽根体と前記第2の羽根体と、

前記第1の羽根体の外周面と前記第2の羽根体の外周面の接線方向に略沿うように前記ファン本体部の中心の上下部位において一対が配設されるとともに、発生磁界方向が前記連続回転駆動のための周期で変化する先端において相互に90度の電気角をなす様に配設された磁界発生手段と、

前記第1の羽根体または前記第2の羽根体の回転状態を検出するために前記磁界発生手段との間の電気角度が90度の関係で配設される検出手段と、

を具備することを特徴とする送気用ファン装置。

【請求項3】 前記第1の羽根体の外周面と前記第2の羽根体の外周面の接線方向に略沿うとともに、発生磁界方向が前記連続回転駆動のための周期で変化する相互に90度の電気角をなす様に配設された補助磁界発生手段をさらに備えることを特徴とする請求項2に記載の送気用ファン装置。

【請求項4】 連続回転駆動される第1の羽根体と第2の羽根体とを一体的に併設してなる送気用ファン装置であって、

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前記第1の羽根体と前記第2の羽根体を回転自在に支持する軸支部と、前記各羽根体の送気方向の前後部位においてそれぞれ開口した第1の開口部と第2の開口部とを有するファン本体部と、

前記軸支部により軸支される回転中心軸から外側に向けて形成される複数の羽根部と、該羽根部の外周部位から円環状に形成されるとともに、角度90度で4分割されてラジアル方向に極性を相互に違えて着磁された多極永久磁石とから形成される前記第1の羽根体と前記第2の羽根体と、

前記第1の羽根体と前記第2の羽根体に挟まれて配設されるとともに、発生磁界方向を前記連続回転駆動のための周期で変化する磁界切り換え回路に接続され、略中心位置で極性が切り換わる磁界発生手段と、

を具備することを特徴とする送気用ファン装置。

【請求項5】 前記第1の羽根体と前記第2の羽根体は、吸気専用か、排気専用か、または吸気と排気とを同時に行うための羽根形状にそれぞれ設定されていることを特徴とする請求項1から請求項4のいずれか1項に記載の送気用ファン装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は送気用ファン装置に係り、特に小型電子機器に内蔵されて吸気または排気を専用に行うか、または吸気と排気を同時に行うために使用される小型の送気用ファン装置に関するものである。

【0002】

【従来の技術】 従来より、各種の電気・電子機器に設けられてなり、内蔵される電気・電子部品の過剰な温度上昇を防止するための送気用ファンが使用されている。このような送気用ファンの代表的なものとしては、軸流ファンと呼ばれる形式のものが知られている。

【0003】 例えば、実開平2-142960号公報において提案されている直流軸流ファンによれば、扁平な正形状に構成される本体の中央部位において、ファン羽根と多極着磁された永久磁石とを一体に設けたファンロータを回転自在に支持しておき、本体側において回転磁界を発生するステータを設けておき、ファンロータの回転制御をロータの回転状態を非接触状態で検出して行うものが知られている。一方、ファンロータの外周部位において永久磁石を固定しておき、その回りにおいて回転磁界を発生するステータを設ける外周駆動形式の軸流ファンが、実公平6-46224号公報において開示されている。

【0004】 上記の各軸流ファンの本体外形をなす1辺の寸法L、厚さ寸法Dと発生風量Qの関係は図10に示されるように、外形寸法と風量Qの関係は略正比例の関係であることが知られている。本図において、本体の1辺の寸法Lが120mmで厚さ寸法Dが25mmのものから、辺の寸法Lが60mmで厚さ寸法Dが20mm程度

のものまでが規格化されて生産されている。また、その発生風量Qは直線Aで示される略直線的な関係となっており、この関係を破線Bで示されるようにさらに延長して例えば1辺の寸法Lが50mmに設定した場合には、風量が「ゼロ」になってしまうことも知られている。即ち、軸流ファンの構造上の制限として、小型にすることによりファンロータの羽根を設けるための面積が永久磁石の占める面積により阻害されることになるので、風量が確保できなくなることから、1辺の寸法Lが50mm前後までが限界とされている。

【0005】そこで、内蔵される機器の寸法上の制限などから1辺の寸法Lを50mmよりさらに小さく設定しなければならない場合には、上述のように偏平に構成できるなどの利点を備えた軸流ファンの採用を諦めて、例えば小型直流モータの出力軸にファン体を直接固定するなどして送気用ファンを構成して、図10中の曲線Cに極力近似させるようにして対処している。

【0006】

【発明が解決しようとする課題】しかしながら、上述のように、例えば小型直流モータの出力軸に対してファン体を直接固定するなどして送気用ファンを構成する場合には、直流モータの全長寸法から決定される厚さ寸法が増加してしまう問題点と、専用の取付け金具等が必要となる問題点があった。また、上記の外周駆動形式の軸流ファンによれば、小型化した場合には羽根面積を大きく設定できないことから、十分な風量Qの確保ができない問題点があった。

【0007】したがって、本発明は上述した各問題点に鑑みてなされたものであり、その目的とするところは、従来より軸流ファンの限界とされていた1辺の寸法Lを例えば50mm以下に小さく設定した場合であっても、十分な風量を確保でき、かつ偏平に構成でき、しかも専用取付け金具なしで各種機器に取付け可能にできるようにして、従来の軸流ファンと略同様に扱うことができる送気用ファンの提供にある。

【0008】

【課題を解決するための手段】上述の課題を解決し、目的を達成するために、本発明によれば、連続回転駆動される第1の羽根体と第2の羽根体とを一体的に併設してなる送気用ファン装置であって、前記第1の羽根体と前記第2の羽根体を回転自在に支持する軸支部と、前記各羽根体の送気方向の前後部位においてそれぞれ開口した第1の開口部と第2の開口部とを有するファン本体部と、前記軸支部により軸支される回転中心軸から外側に向けて形成される複数の羽根部と、該羽根部の外周部位から円環状に形成されるとともに、等角度で複数に分割されてラジアル方向に極性を相互に違えて着磁された多極永久磁石とから形成される前記第1の羽根体と前記第2の羽根体と、前記第1の羽根体の外周面と前記第2の羽根体の外周面の接線方向に略沿うように発生磁界方向

が変化する磁界発生手段とを具備することを特徴としている。

【0009】また、連続回転駆動される第1の羽根体と第2の羽根体とを一体的に併設してなる送気用ファン装置であって、前記第1の羽根体と前記第2の羽根体を回転自在に支持する軸支部と、前記各羽根体の送気方向の前後部位においてそれぞれ開口した第1の開口部と第2の開口部とを有するファン本体部と、前記軸支部により軸支される回転中心軸から外側に向けて形成される複数の羽根部と、該羽根部の外周部位から円環状に形成されるとともに、略等角度で複数に分割されてラジアル方向に極性を相互に違えて着磁された多極永久磁石とから形成される前記第1の羽根体と前記第2の羽根体と、前記第1の羽根体の外周面と前記第2の羽根体の外周面の接線方向に略沿うように前記ファン本体部の中心の上下部位において一対分が配設されるとともに、発生磁界方向が前記連続回転駆動のための周期で変化し、相互に90度の電気角をなす様に配設された磁界発生手段と、前記第1の羽根体または前記第2の羽根体の回転状態を検出するために前記磁界発生手段と間の電気角度が90度の関係で配設される検出手段とを具備することを特徴としている。

【0010】また、前記第1の羽根体の外周面と前記第2の羽根体の外周面の接線方向に略沿うとともに、発生磁界方向が前記連続回転駆動のための周期で変化する補助磁界発生手段をさらに備えることを特徴としている。

【0011】また、連続回転駆動される第1の羽根体と第2の羽根体とを一体的に併設してなる送気用ファン装置であって、前記第1の羽根体と前記第2の羽根体を回転自在に支持する軸支部と、前記各羽根体の送気方向の前後部位においてそれぞれ開口した第1の開口部と第2の開口部とを有するファン本体部と、前記軸支部により軸支される回転中心軸から外側に向けて形成される複数の羽根部と、該羽根部の外周部位から円環状に形成されるとともに、角度90度で4分割されてラジアル方向に極性を相互に違えて着磁された多極永久磁石とから形成される前記第1の羽根体と前記第2の羽根体と、前記第1の羽根体と前記第2の羽根体に挟まれて配設されるとともに、発生磁界方向を前記連続回転駆動のための周期で変化する磁界切り換え回路に接続される磁界発生手段とを具備することを特徴としている。

【0012】そして、前記第1の羽根体と前記第2の羽根体は、吸気専用か、排気専用か、または吸気と排気とを同時に行うための羽根形状にそれぞれ設定されていることを特徴としている。

【0013】

【作用】以上の構成において、第1の開口部と第2の開口部とを有するファン本体部において第1の羽根体と第2の羽根体が連続回転自在に軸支される一方、各羽根

体において等角度で複数に分割されてラジアル方向に極性を相互に違えて着磁された多極永久磁石の接線方向に略沿うように磁界発生手段の発生磁界方向が変化して、第1の羽根体と第2の羽根体が連続回転するように働く。

【0014】

【実施例】以下、本発明の各実施例について添付の図面を参照して説明する。先ず、図1は第1実施例の送気ファンの要部を破断して示した正面図である。また、図2は図1の中心断面図である。

【0015】両図において、送気用ファンは連続回転駆動される第1の羽根体4と第2の羽根体5を図示のように併設することを最大の構造上の特徴点としており、図示のように横辺の寸法Lを例えば50mm以下に小さく設定し、また高さ寸法を25mm前後にして非常に小型に構成した場合であっても、十分な風量を確保でき、かつ厚さ寸法Dも小さく構成して扁平に構成できるようにしている。しかもベース1の4隅に設けられた取付け孔1aを使用して、例えば取付け孔1aにネジを挿通してネジ止めすることで各種機器に取付け可能にできるように構成されている。この場合、取付けられる装置との関係から、専用の取付け部品を介して取り付けられるようにしても良い。また、複数枚数分を隣接して設けるようにして所望の吸気と排気の風量を得るようにするか、または第1の羽根体4に吸気を行わせまた第2の羽根体5で排気を行うようにして1台で吸気と排気をできるようにも構成されている。

【0016】さて、所定樹脂材料もしくは所定金属材料から構成されるベース1には、第1の開口部2と第2の開口部3とが図示のようにそれぞれ形成されており、回転により発生する風を所定方向に抵抗なく通過させるようにしている。一方、これらの各開口部2、3の中心部位において第1の羽根体4と第2の羽根体5を書記位置を得るために低い負荷で回転自在に支持するとともに、回転時に発生するスラスト荷重を受けるためのピボット軸受7が、ベース1から十文字状（これに限定されず、一文字乃至片支持でもよい）で延設される支持部6の中心部位にそれぞれ設けられている。

【0017】一方、これらのピボット軸受7により軸支される第1の羽根体4と第2の羽根体5は、後述するように所定樹脂乃至永久磁石、またはプラスチックマグネットから一体射出形成等されるか、または永久磁石に羽根を固定するとともに、各羽根体の中心において例えばインサート成形により設けられる金属製の中心軸体10の上下部位を上記のピボット軸受7により回転自在に支持するように構成されている。

【0018】このように支持される各羽根体4、5は、回転中心軸となる中心軸体10から外側に向けて形成される複数の羽根部9と、これらの羽根部9の外周部位から円環状に形成されるとともに、等角度の90度で4分

割されて図示のように磁極部8a、8b、8c、8dがラジアル方向に極性を相互に違えて着磁された多極永久磁石8とから構成されている。これらの各羽根体4、5は、近年盛んに使用されている希土類金属微細体を樹脂に混入した所謂プラスチックマグネット材料を用いて羽根部9と分極永久磁石8の全てを一体樹脂成形した後に、所望の着磁を行うようにすることで安価であって、しかも高い精度の完成品を得ることができる。

【0019】一方、以上のようにベース1で軸支される第1の羽根体4と第2の羽根体5は、静止状態において、互いの磁極部8dが吸引される状態で安定する結果、常に一定の停止位置において停止できるようになり、起動の際に確実に磁界を所望の磁極部に作用させることができる。

【0020】続いて、第1の羽根体4の外周面と第2の羽根体5の外周面の接線方向に沿い、かつその先端が相互に電気角90度をなすように、ベース1の上下部位においてその発生磁界方向が変化する第1のコイル11と第2のコイル12とが配設されている。また、図示のように第1の羽根体4の近傍において、コイル11、12となす電気角度が90度になる位置において、ホール素子からなる磁気センサ13が配設されており、回転にともなう磁極部8a、8b、8c、8dの磁気変化をオンオフ信号の電気信号に変換するとともに、駆動回路に対して信号を伝えるようにしている。

【0021】図3は、上記の第1のコイル11と第2のコイル12において発生磁界方向が図1に示すように変化させる回路図である。先ず、図3(a)において、図示のようにコイル11、12同士を直列に接続しておき、各リード線をトランジスタのコレクタ側に接続する一方、エミッタ側に直流電源Vcc（例えば直流電圧5ボルトのプラス側）を接続して、磁気センサ13のオンオフに応じて、各トランジスタのベース電圧をオンオフして所望の電流i1、i2を各コイル11、12に通電することにより磁極の切り換えを行うようにしている。また、図3(b)においては、磁気センサ13に対して各トランジスタのベース側をそれぞれ接続する一方、トランジスタのエミッタ側に各コイル11、12を接続して、磁気センサ13のオンオフに応じて、各トランジスタのベース電圧をオンオフして所望の電流i1、i2を各コイル11、12に通電することにより磁極の切り換えを行うようにしている。

【0022】以上のようにして、各コイル11、12の極性NとSをコイル端部において切り換えることにより、各羽根体4、5の磁極部8a、8b、8c、8dが接線方向に順次吸引反発されて回転されて、風量発生時の負荷の釣り合い状態において回転が安定して連続駆動される。

【0023】以上のようにして、内蔵される機器の寸法上の制限などから1辺の寸法Lを50mmよりさらに小

さく設定しなければならない場合であっても、従来の軸流ファンと略同じ機械的及び電氣的仕様で採用することができる。

【0024】次に、図4は図1の第1実施例の変形例を示した正面図であって、既に説明済みの構成には同一符号を付して説明を割愛すると、本図において、上記の第1コイル11、と第2コイル12に、さらにコイル21、22、23、24がベース1の4隅部位にそれぞれ端部において電気角が90度となるように配設されており、各コイルに通電することにより各コイルの長手方向に磁極の切り換えを行うようにしている。

【0025】以上のように構成することにより、各コイル21、22、23、24が補助的な磁気吸引と磁気反発を羽根体4、5の磁極部8a、8b、8c、8dに対して作用する結果、より円滑に回転駆動され、風量発生時の負荷の釣り合い状態において回転が安定して連続駆動されることになる。

【0026】そして、図5は第2実施例を示した正面図であって、既に説明済みの構成には同一符号を付して説明を割愛すると、図5において、上記の第1コイル11、と第2コイル12に代えてコイル21、22、23、24がベース1の4隅部位にそれぞれ補助的に配設されており、各コイルに通電することにより各コイルの長手方向に磁極の切り換えを行うようにしている。

【0027】この構成において、各羽根体4、5の磁極部8a、8b、8c、8dが略法線方向に沿うように順次吸引反発されて回転駆動され、風量発生時の負荷の釣り合い状態において回転が安定して連続駆動されることになる。以上のように構成することにより、駆動トルクの向上と回転時の安定度と回転の高速化をさらに向上することができる。

【0028】図6は第3実施例を示した正面図であって、既に説明済みの構成には同一符号を付して説明を割愛する。本図において、上記の各実施例における第1コイル11、と第2コイル12に代えて図示のような鼓状の平面上投影形状の主コイル15が各羽根体4、5の中心位置に配設されている。また、磁性材料からなるピン30、31がベース1の開ロ部2、3の内周面部位に配設されており、各羽根体4、5の静止時における初期位置決めを磁界不平衡状態から行うように構成されている。

【0029】また、駆動回路は図7に示すように、水晶または簡単なLCR回路等からなる発振器からの周期信号を分周器で分周して所望の駆動波形を得た後に、主コイル15において発生磁界方向が変化するように構成している。

【0030】本図において、主コイル15の各リード線をトランジスタTA、TBのコレクタ側に接続する一方、エミッタ側に直流電源Vcc（例えば直流電圧5ボルトのプラス側）を接続する。また、ベース側は分周器

に一方が直接また他方がインバータを介してそれぞれ接続されている。

【0031】以上の構成において、分周器で分周された駆動信号のオンオフに応じて、各トランジスタのベース電圧がオンオフされて所望の電流i1、i2を主コイル15に通電することにより磁極の切り換えを行うようにしている。

【0032】以上のように主コイル15に通電することにより磁極の切り換えを行うことで、図8に示した動作状態図を得る。

【0033】本図において各羽根体4、5の磁極部が略法線方向に沿うように順次吸引反発されて同期的に回転駆動され、風量発生時の負荷の釣り合い状態において回転が安定して連続駆動されることになる。

【0034】図9は、使用状態例を示した外観図であって、(a)において、例えば取付け孔1aにネジを挿通して機器100にネジ止めすることで専用取付け金具なしで各種機器に取付け可能にできる。また、第1の羽根体4に吸気を行わせまた第2の羽根体5で排気を行うようにして1台で吸気と排気をできるように構成されている。また、(b)において、機器100には換気孔101が穿設されており、複数台数分を隣接して設けるようにして所望の吸気のみを行わせ、排気を換気孔101から行うようにしている。

【0035】以上のように送気用ファンを構成することにより、図10の関係図において、曲線Cで示される領域においても十分な発生風量Qを得ることが可能となる。したがって、従来は諦められていた1辺の寸法Lが60mm以下であって、また厚さ寸法Dが20mm以下の送気用ファンまでも規格化できることになる。

【0036】

【発明の効果】以上述べたように、本発明によれば、従来より軸流ファンの限界とされていた1辺の寸法Lを例えば50mm以下に小さく設定した場合でも、十分な風量を確保することができ、かつ扁平に構成することのできる送気用ファンを提供することができる。

【0037】

【図面の簡単な説明】

【図1】第1実施例の送気用ファンの平面図である。

【図2】図1の中心断面図である。

【図3】第1実施例の送気用ファンの駆動回路図である。

【図4】第1実施例の送気用ファンの変形例の平面図である。

【図5】第2実施例の送気用ファンの平面図である。

【図6】第3実施例の送気用ファンの平面図である。

【図7】第3実施例の送気用ファンの駆動回路図である。

【図8】第3実施例の送気用ファンの動作説明の平面図

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である。

【図9】送気用ファンの使用例の外観図である。

【図10】軸流ファンの寸法L、厚さ寸法Dと発生風量Qの関係図である。

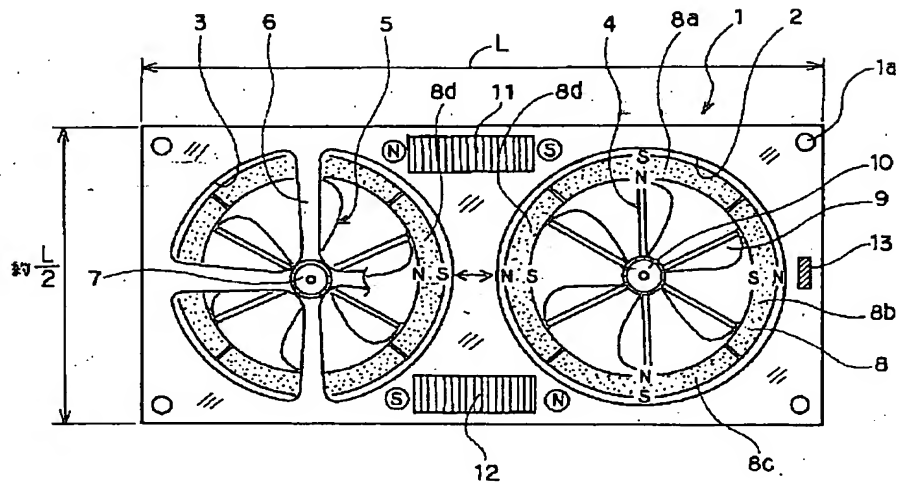
【符号の説明】

- 1 ベース
- 2 第1開口部
- 3 第2開口部
- 4 第1の羽根体
- 5 第2の羽根体

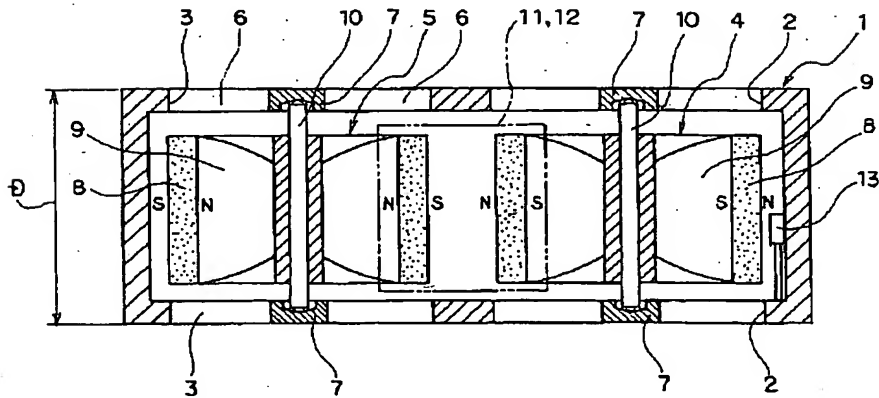
- 6 支持部
- 7 ピボット軸受
- 8 分極永久磁石
- 9 羽根部
- 10 中心軸体
- 11 第1コイル
- 12 第2コイル
- 13 磁気センサ
- 15 主コイル

10

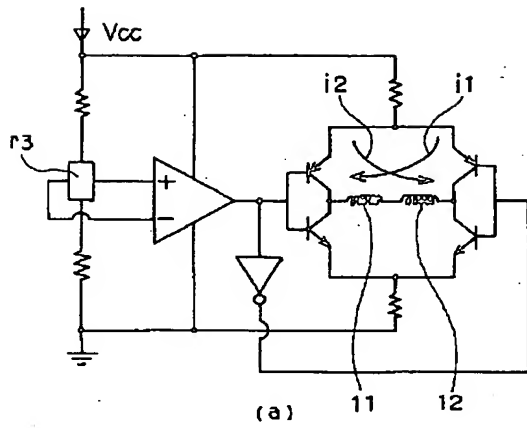
【図1】



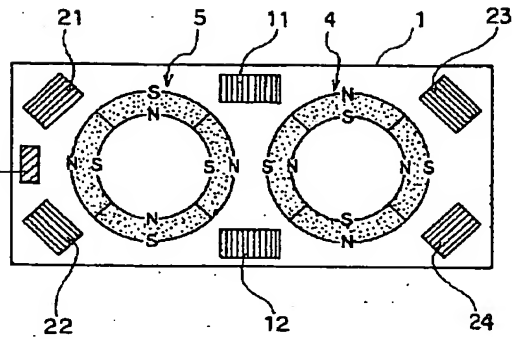
【図2】



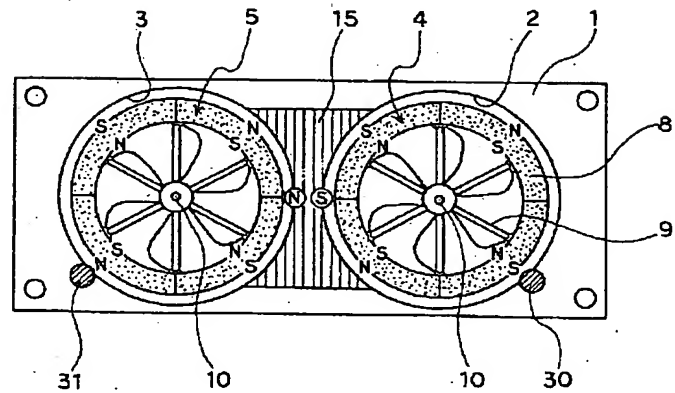
【図3】



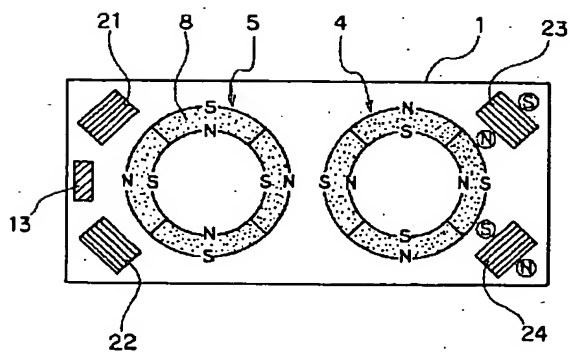
【図4】



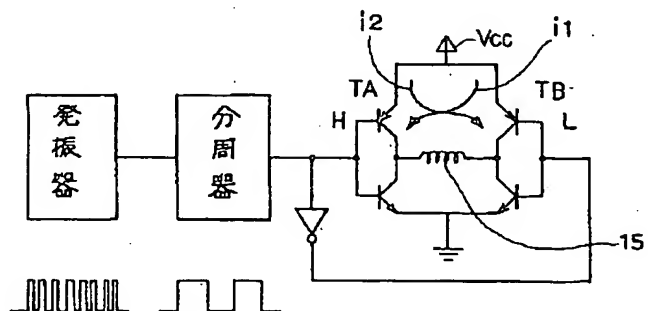
【図6】



【図5】

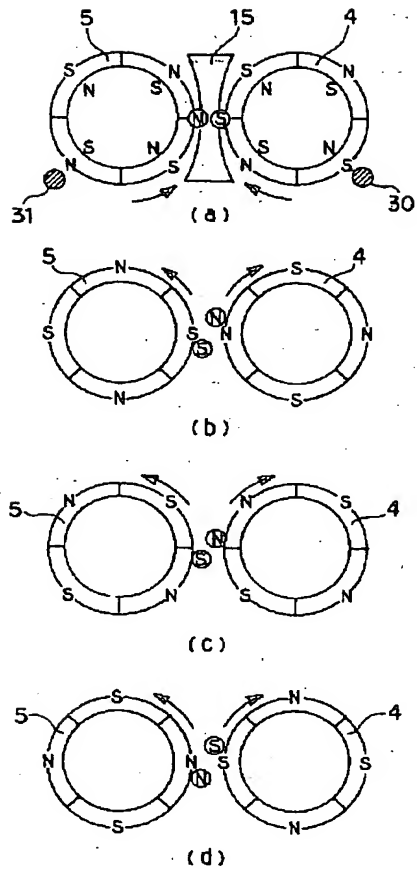


【図7】

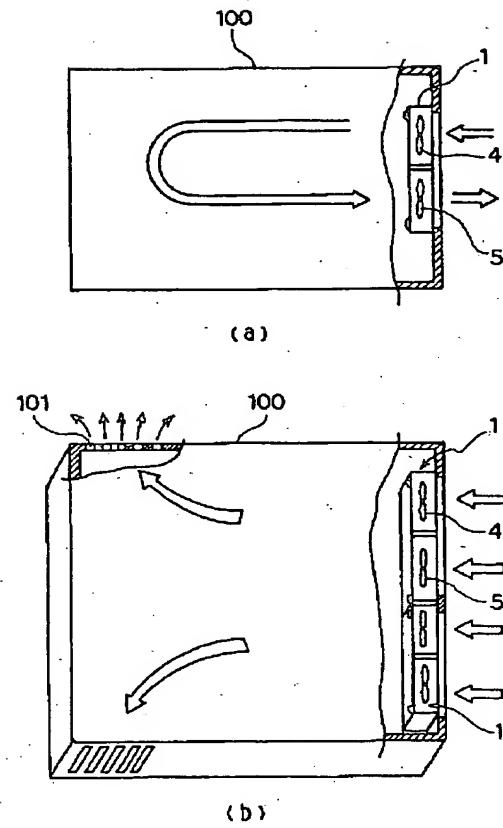


TA	H	L
TB	L	H
電流	i1	i2

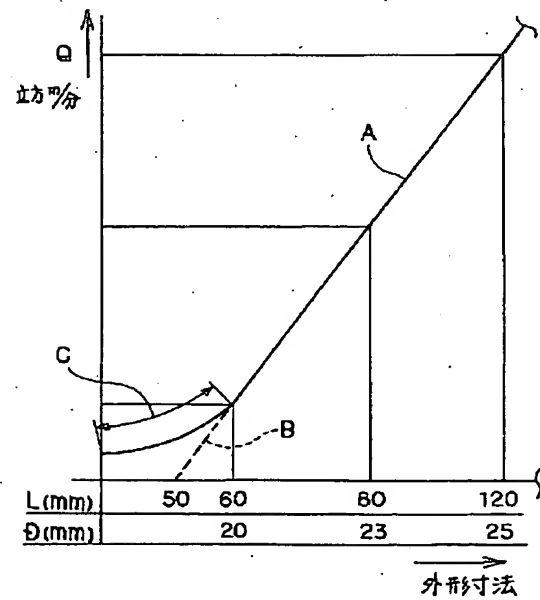
【図8】



【図9】



【図10】



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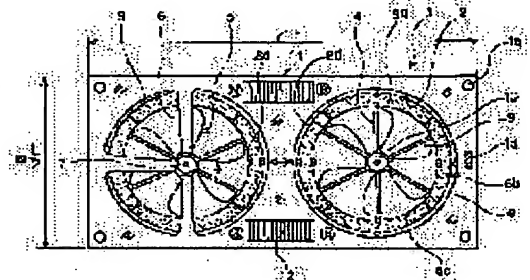
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(54) AIR SUPPLY FAN

(57)Abstract

PURPOSE: To obtain an air supply fan in which the air flow rate can be ensured sufficiently even at a low level and which can be made flat so that it can be fixed to various apparatus without requiring any special fixing metal and can be handled similarly to a conventional axial fan.

CONSTITUTION: The air supply fan comprises a section 7 for supporting first and second blade bodies 4, 5 rotatably, a fan body section 1 having first and second openings 2, 3 opening in the air supply direction of respective blade bodies, a plurality of blade sections 9 directing outward from the central rotary shaft 10, a multipolar permanent magnet 8 formed circularly at the outer circumferential part, and means 11, 12 for generating field having variable direction substantially in the tangential direction.



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CLAIMS

[Claim(s)]

[Claim 1] The support section which is fan equipment for supplied airs which it comes to annex in one, and supports the 1st wing object and the 2nd wing object by which a continuation rotation drive is carried out for said 1st wing object and said 2nd wing object, enabling free rotation. The fan body section which has the 1st opening which carried out opening in the direction order part of a supplied air of each of said wing object, respectively, and the 2nd opening. While being formed in the shape of a circular ring from the periphery part of two or more wing sections formed towards an outside from the center-of-rotation shaft supported to revolve by said support section, and this wing section The 1st [said] wing object which is divided into plurality with equiangular and formed in a radial direction from the multi-electrode permanent magnet magnetized by changing a polarity mutually, and said 2nd wing object, the tangential direction of the peripheral face of said 1st wing object, and the peripheral face of said 2nd wing object — **** — the fan equipment for supplied airs characterized by providing a field generating means by which the direction of a generating field changes like.

[Claim 2] The support section which is fan equipment for supplied airs which it comes to annex in one, and supports the 1st wing object and the 2nd wing object by which a continuation rotation drive is carried out for said 1st wing object and said 2nd wing object, enabling free rotation. The fan body section which has the 1st opening which carried out opening in the direction order part of a supplied air of each of said wing object, respectively, and the 2nd opening. While being formed in the shape of a circular ring from the periphery part of two or more wing sections formed towards an outside from the center-of-rotation shaft supported to revolve by said support section, and this wing section The 1st [said] wing object which is divided into plurality with equiangular and formed in a radial direction from the multi-electrode permanent magnet magnetized by changing a polarity mutually, and said 2nd wing object, the tangential direction of the peripheral face of said 1st wing object, and the peripheral face of said 2nd wing object — ****, while a part for a pair is arranged in the vertical part of the core of said fan body section like The field generating means arranged so that the direction of a generating field might change with the period for said continuation rotation drive and might make the electrical angle of 90 degrees mutually in a tip. Fan equipment for supplied airs characterized by providing the detection means arranged by the relation whose electrical degree between said field generating means is 90 degrees in order to detect the rotation condition of said 1st wing object or said 2nd wing object.

[Claim 3] Fan equipment for supplied airs according to claim 2 characterized by having further the auxiliary field generating means arranged in the tangential direction of the peripheral face of said 1st wing object, and the peripheral face of said 2nd wing object so that the direction of a generating field might change with the period for said continuation rotation drive and might make the electrical angle of 90 degrees mutually with ****.

[Claim 4] The support section which is fan equipment for supplied airs which it comes to annex in one, and supports the 1st wing object and the 2nd wing object by which a continuation rotation drive is carried out for said 1st wing object and said 2nd wing object, enabling free rotation. The fan body section which has the 1st opening which carried out opening in the direction order part of a supplied air of each of said wing object, respectively, and the 2nd opening. While being formed in the shape of a circular ring from the periphery part of two or more wing sections formed towards an outside from the center-of-rotation shaft supported to revolve by said support section, and this wing section While being quadrisectioned at 90 include angles, being inserted into the 1st [said] wing object formed from the multi-electrode permanent magnet magnetized by changing a polarity mutually, said 2nd wing object, said 1st wing object, and said 2nd wing object and being arranged in a radial direction Fan equipment for supplied airs characterized by providing a field generating means by which connect with the field switch circuit which changes with the period for said continuation rotation drive, and a polarity cuts and replaces the direction of a generating field in an abbreviation center position.

[Claim 5] Said 1st wing object and said 2nd wing object are fan equipment for supplied airs given in any 1 term of claim 1 to claim 4 characterized by being set as the wing configuration for performing only only for inhalation of air, for exhaust air or inhalation of air, and exhaust air to coincidence, respectively.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the small fan equipment for supplied airs used in order to start the fan equipment for supplied airs, especially to be built in small electronic equipment, and to carry out inhalation of air or exhaust air to dedication or to perform inhalation of air and exhaust air to coincidence.

[0002]

[Description of the Prior Art] The fan for supplied airs for conventionally preventing the superfluous temperature rise of the electrical and electric equipment and electronic parts which it comes to prepare in various kinds of electrical and electric equipment, and are built in it is used. As a typical thing of such a fan for supplied airs, the thing of the format called an axial flow fan is known.

[0003] For example, the fan rotor which prepared in one the permanent magnet by which multi-electrode magnetization was carried out with the fan wing in the central part of the body which is constituted in the shape of [flat] a square according to the direct-current axial flow fan proposed in JP.2-142960,U is supported free [rotation], the stator which generates rotating magnetic field is prepared in the body side, and what detects the rotation condition of Rota in the state of non-contact, and performs the roll control of a fan rotor is known. On the other hand, the permanent magnet is fixed in the periphery part of a fan rotor, and the axial flow fan of the periphery drive format of preparing the stator which generates rotating magnetic field around it is indicated in JP.6-46224,Y.

[0004] As the relation between the dimension L of one side which makes the body appearance of each above-mentioned axial flow fan, the thickness dimension D, and the generating airflow Q is shown in drawing 10, it is known that the relation between a dimension and airflow is the relation of abbreviation direct proportion. In this Fig., by 120mm, even that whose thickness dimension D the dimension L of a thing to the side whose thickness dimension D is 25mm is about 20mm in 60mm is standardized, and the dimension L of one side of a body is produced. moreover, abbreviation that generating airflow Q is indicated to be in a straight line A — when this relation is extended further, for example, the dimension L of one side sets it as 50mm as shown by the broken line B since it had become linear relation, it is also known that airflow will become "zero." That is, since the area for preparing the wing of a fan rotor by making it small as a limit on the structure of an axial flow fan will be checked by the area which a permanent magnet occupies and it becomes impossible to secure airflow, 50mm order is made into the limitation for the dimension L of one side.

[0005] So, when the dimension L of one side must be set up from the limit on sizing built in etc. still smaller than 50mm, adoption of the axial flow fan equipped with the advantage of being able to constitute flatly as mentioned above is given up, for example, a fan object is directly fixed to the output shaft of a small direct-current motor, the fan for supplied airs is constituted, and the curve C in drawing 10 is made to resemble as much as possible, and is made and coped with.

[0006]

[Problem(s) to be Solved by the Invention] However, when a fan object was directly fixed to the output shaft of a small direct-current motor and the fan for supplied airs was constituted as mentioned above, there were a trouble which the thickness dimension determined from the overall-length dimension of a DC motor increases, and a trouble that the fixing metal of dedication etc. was needed. Moreover, according to the axial flow fan of the above-mentioned periphery drive format, when it miniaturized, there was a trouble which cannot perform reservation of sufficient airflow Q from the ability of wing area not to be set up greatly.

[0007] Therefore, the place which this invention is made in view of each trouble mentioned above, and is made into the purpose Even if it is the case where the dimension L of one side conventionally made into the limitation of an axial flow fan is small set as 50mm or less As sufficient airflow can be secured, and it can constitute flatly and anchoring to various devices is moreover enabled [having no exclusive fixing metal and], it is in offer of the conventional axial flow fan and the fan for supplied airs who can treat like abbreviation.

[0008]

[Means for Solving the Problem] In order to solve an above-mentioned technical problem and to attain the purpose, according to this invention, it is fan equipment for supplied airs which comes in one to annex the 1st wing object and the 2nd wing object by which a continuation rotation drive is carried out. The support section supported for said 1st wing object and said 2nd wing object, enabling free rotation, The fan body section which has the 1st opening which carried out opening in the direction order part of a supplied air of each of said wing object, respectively, and the 2nd opening, While being formed in the shape of a circular ring from the periphery part of two or more wing sections formed towards an outside from the center-of-rotation shaft supported to revolve by said support section, and this wing section The 1st [said] wing object which is divided into plurality with equiangular and formed in a radial direction from the multi-electrode permanent magnet magnetized by changing a polarity mutually, and said 2nd wing object, the tangential direction of the peripheral face of said 1st wing object, and the peripheral face of said 2nd wing object — ***** — it is characterized by providing a field generating means by which the direction of a generating field changes like.

[0009] Moreover, the support section which is fan equipment for supplied airs which it comes to annex in one, and supports the 1st wing object and the 2nd wing object by which a continuation rotation drive is carried out for said 1st wing object and said 2nd wing object, enabling free rotation. The fan body section which has the 1st opening which carried out opening in the direction order part of a supplied air of each of said wing object, respectively, and the 2nd opening. While being formed in the shape of a circular ring from the periphery part of two or more wing sections formed towards an outside from the center-of-rotation shaft supported to revolve by said support section, and this wing section The 1st [said] wing object which is divided into plurality with abbreviation equiangular and formed in a radial direction from the multi-electrode permanent magnet magnetized by changing a polarity mutually, and said 2nd wing object, the tangential direction of the peripheral face of said 1st wing object, and the peripheral face of said 2nd wing object — *****, while a part for a pair is arranged in the vertical part of the core of said fan body section like The field generating means arranged so that the direction of a generating field might change with the period for said continuation rotation drive and might make the electrical angle of 90 degrees mutually. In order to detect the rotation condition of said 1st wing object or said 2nd wing object, the electrical degree between said field generating means is characterized by providing the detection means arranged by the relation which is 90 degrees.

[0010] Moreover, it is characterized by the direction of a generating field equipping further the tangential direction of the peripheral face of said 1st wing object, and the peripheral face of said 2nd wing object with an auxiliary field generating means to change with the period for said continuation rotation drive, with *****.

[0011] Moreover, the support section which is fan equipment for supplied airs which it comes to annex in one, and supports the 1st wing object and the 2nd wing object by which a continuation rotation drive is carried out for said 1st wing object and said 2nd wing object, enabling free rotation. The fan body section which has the 1st opening which carried out opening in the direction order part of a supplied air of each of said wing object, respectively, and the 2nd opening. While being formed in the shape of a circular ring from the periphery part of two or more wing sections formed towards an outside from the center-of-rotation shaft supported to revolve by said support section, and this wing section While being quadrisected at 90 include angles, being inserted into the 1st [said] wing object formed from the multi-electrode permanent magnet magnetized by changing a polarity mutually, said 2nd wing object, said 1st wing object, and said 2nd wing object and being arranged in a radial direction It is characterized by providing the field generating means connected to the field switch circuit which changes with the period for said continuation rotation drive in the direction of a generating field.

[0012] And said 1st wing object and said 2nd wing object are characterized by being set as the wing configuration for performing only for inhalation of air, for exhaust air or inhalation of air, and exhaust air to coincidence, respectively.

[0013]

[Function] While the 1st wing object and the 2nd wing object are supported to revolve free [continuation rotation] in the above configuration in the fan body section which has the 1st opening and 2nd opening the tangential direction of the multi-electrode permanent magnet which was divided into plurality with equiangular in each wing object, and was magnetized by the radial direction by changing a polarity mutually — ***** — the direction of a generating field of a field generating means changes like, and it works so that the 1st wing object and the 2nd wing object may carry out continuation rotation.

[0014]

[Example] Hereafter, each example of this invention is explained with reference to an attached drawing. First, drawing 1 is the front view having fractured and shown the important section of the supplied-air fan of the 1st example. Moreover, drawing 2 is the central sectional view of drawing 1.

[0015] In both drawings, the fan for supplied airs makes it the focus on the greatest structure to annex like illustration of the 1st wing object 4 and the 2nd wing object 5 by which a continuation rotation drive is carried out. Even if it is the case where set the dimension L of the horizontal side as 50mm or less small like illustration, and carried out the height dimension before and after 25mm, and it constitutes very small, sufficient airflow can be secured, and the thickness dimension D is constituted small, and it enables it to constitute flatly. And it is constituted so that anchoring to various devices may be enabled in the thing which was prepared in four corners of the base 1 and which attach, and uses hole 1a, for example, inserts in and carries out the screw stop of the screw to anchoring hole 1a. In this case, you may make it attach through the fittings of dedication from relation with the equipment attached. Moreover, it is constituted also so that inhalation of air and exhaust air can be performed in one set, as obtain the airflow of desired inhalation of air and exhaust air as two or more set minutes of several are prepared adjacently, or inhalation of air is made to carry out to the 1st wing object 4 and it exhausts with the 2nd wing object 5 again.

[0016] Now, the 1st opening 2 and 2nd opening 3 are formed in the base 1 which consists of a predetermined resin ingredient or a predetermined metallic material like illustration, respectively, and he is trying to pass the wind generated by rotation without resistance in the predetermined direction. On the other hand, by setting at least to the core of each of these openings 2 and 3, in order to obtain a secretary location, while supporting the 1st wing object 4 and the 2nd wing object 5 free [rotation with a low load] The pivot bearing 7 for receiving thrust loading generated at the time of rotation is formed at least in the core of the supporter 6 installed from the base 1 by the shape of a cross (it may not be limited to this but a single character thru/or piece support are sufficient), respectively.

[0017] On the other hand, the 1st wing object 4 and the 2nd wing object 5 which are supported to revolve by such pivot bearing 7 While injection formation etc. is really carried out from Sadashige Tokoro fat thru/or a permanent magnet, or a plastics magnet or fixing a wing to a permanent magnet so that it may mention later It is constituted so that the vertical part of the metal medial-axis object 10 established by insert molding in the core of each wing object may be supported free [rotation] by the above-mentioned pivot bearing 7.

[0018] Thus, while each wing objects 4 and 5 supported are formed in the shape of a circular ring from the periphery part of two or more wing sections 9 formed towards an outside from the medial-axis object 10 used as a center-of-rotation shaft, and these wing sections 9 It is quadrisected at 90 equiangular degrees and the magnetic pole sections 8a, 8b, 8c, and 8d consist of multi-electrode permanent magnets 8 magnetized by the radial direction by changing a polarity mutually like illustration. After each of these wing objects 4 and 5 really carry out resin shaping of all the wing sections 9 and polarization permanent magnets 8 using the so-called plastics magnet ingredient which mixed in resin the rare earth metal detailed object

used briskly in recent years, they can be cheap and, moreover, can obtain the finished product of a high precision because it is made to magnetize a request.

[0019] In a fixed halt location, it can always be stopped now by the 1st wing object 4 and the 2nd wing object 5 which are supported to revolve with the base 1 as mentioned above on the other hand, and they can be made to act on the magnetic pole section of a request of a field certainly in a quiescent state, in the case of starting, as a result of being stabilized in the condition that 8d of mutual magnetic pole sections is attracted.

[0020] Then, along the tangential direction of the peripheral face of the 1st wing object 4, and the peripheral face of the 2nd wing object 5, the 1st coil 11 and 2nd coil 12 from which the direction of a generating field changes in the vertical part of the base 1 are arranged so that the tip may make 90 electrical angles mutually. Moreover, while the magnetometric sensor 13 with which the electrical degree made with coils 11 and 12 [near the 1st wing object 4] consists of a hall device in the location which becomes 90 degrees is arranged like illustration and changing magnetic pole sections [accompanying rotation / 8a 8b, 8c, and 8d] magnetic variation into the electrical signal of an on-off signal, he is trying to tell a signal to a drive circuit.

[0021] Drawing 3 is a circuit diagram changed as the direction of a generating field shows the 1st above-mentioned coil 11 and 2nd above-mentioned coil 12 to drawing 1. First, in drawing 3 (a), a coil 11 and 12 comrades are connected to the serial like illustration. While connecting each lead wire to the collector side of a transistor, DC power supply Vcc (for example, plus side with a direct current voltage of 5 volts) are connected to an emitter side. It is made to switch a magnetic pole by turning on and off the base electrical potential difference of each transistor, and energizing the desired current i1 and i2 in each coils 11 and 12 according to turning on and off of a magnetometric sensor 13. Moreover, in drawing 3 (b), while connecting the base side of each transistor to a magnetometric sensor 13, respectively, each coils 11 and 12 are connected to the emitter side of a transistor, and it is made to switch a magnetic pole by turning on and off the base electrical potential difference of each transistor, and energizing the desired current i1 and i2 in each coils 11 and 12 according to turning on and off of a magnetometric sensor 13.

[0022] By switching S in a coil end as the polarity N which are each coils 11 and 12 as mentioned above, to a tangential direction, sequential suction repulsion is carried out, the magnetic pole sections 8a, 8b, 8c, and 8d of each wing objects 4 and 5 rotate, in the balance condition of the load at the time of airflow generating, rotation is stabilized and a continuation drive is carried out.

[0023] even if it is the case where the dimension L of one side must be set up from the limit on sizing built in as mentioned above etc. still smaller than 50mm — the conventional axial flow fan and abbreviation — the same — it is employable by the mechanical and electric specification.

[0024] Next, drawing 4 is the front view having shown the modification of the 1st example of drawing 1, and if it gives the same sign to a configuration of finishing [explanation] already and explanation is omitted, it will be set to this Fig. Further, in the edge, coils 21, 22, 23, and 24 are arranged in about 4 of the base 1 corners by the 1st above-mentioned coil 11 and the 2nd above-mentioned coil 12, respectively so that an electrical angle may become 90 degrees. It is made to switch a magnetic pole to the longitudinal direction of each coil by energizing in each coil.

[0025] As a result of each coils' 21, 22, 23, and 24 acting auxiliary magnetic attraction and magnetic repulsion by constituting as mentioned above to the magnetic pole sections 8a, 8b, 8c, and 8d of the wing objects 4 and 5, a rotation drive is carried out more smoothly, in the balance condition of the load at the time of airflow generating, rotation will be stabilized and a continuation drive will be carried out.

[0026] And it is made to switch a magnetic pole to the longitudinal direction of each coil by replacing with the 1st above-mentioned coil 11 and the 2nd coil 12 in drawing 5, if the same sign is given to a configuration of finishing [are the front view in which drawing 5 showed the 2nd example, and / explanation] already and explanation is omitted, arranging coils 21, 22, 23, and 24 in about 4 of the base 1 corners respectively and auxiliary, and energizing in each coil.

[0027] In this configuration, sequential suction repulsion is carried out, a rotation drive is carried out so that the magnetic pole sections 8a, 8b, 8c, and 8d of each wing objects 4 and 5 may meet in the direction of an abbreviation normal, in the balance condition of the load at the time of airflow generating, rotation will be stabilized and a continuation drive will be carried out. By constituting as mentioned above, improvement in driving torque, the stability at the time of rotation, and rotational high-speed-ization can be improved further.

[0028] Drawing 6 is the front view having shown the 3rd example, gives the same sign to a configuration of finishing [explanation] already, and omits explanation. In this Fig., it replaces with the 1st above-mentioned coil 11 and the 2nd above-mentioned coil 12 in each example, and the main coil 15 of the projection-on flat surface configuration of the shape of a hard drum like illustration is arranged in the center position of each wing objects 4 and 5. Moreover, the pins 30 and 31 which consist of a magnetic material are arranged in the inner skin part of the openings 2 and 3 of the base 1, and it is constituted so that the initial-valve-position arrangement at the time of quiescence of each wing objects 4 and 5 may be performed from a field unbalance condition.

[0029] Moreover, as shown in drawing 7, after a drive circuit carries out dividing of the periodic signal from the oscillator which consists of Xtal or an easy LCR circuit with a counting-down circuit and acquires a desired drive wave, it is constituted so that the direction of a generating field may change in a main coil 15.

[0030] In this Fig., while connecting each lead wire of a main coil 15 to the collector side of Transistors TA and TB, DC power supply Vcc (for example, plus side with a direct current voltage of 5 volts) are connected to an emitter side. Moreover, another side is directly connected to the counting-down circuit for one side by the base side through the inverter again, respectively.

[0031] In the above configuration, it is made to switch a magnetic pole by turning on and off the base electrical potential difference of each transistor, and energizing the desired current i1 and i2 to a main coil 15 according to turning on and off of a driving signal by which dividing was carried out with the counting-down circuit.

[0032] By switching a magnetic pole, the operating state Fig. shown in drawing 8 is obtained by energizing to a main coil 15 as mentioned above.

[0033] Sequential suction repulsion is carried out, a rotation drive is carried out synchronous so that the magnetic pole

section of each wing objects 4 and 5 may meet in the direction of an abbreviation normal in this Fig., in the balance condition of the load at the time of airflow generating, rotation will be stabilized and a continuation drive will be carried out.

[0034] Drawing 9 is the external view having shown the example of a busy condition, and enables [having no exclusive fixing metal and] anchoring to various devices in (a) by inserting a screw in anchoring hole 1a, and carrying out a screw stop to a device 100. Moreover, it is constituted so that inhalation of air and exhaust air can be performed in one set, as inhalation of air is made to carry out to the 1st wing object 4 and it exhausts with the 2nd wing object 5 again. Moreover, in (b), the ventilating hole 101 is drilled by the device 100 and it is made to exhaust by making only desired inhalation of air perform, as two or more set minutes of several are prepared adjacently from the ventilating hole 101.

[0035] By constituting the fan for supplied airs as mentioned above, it becomes possible in the related Fig. of drawing 10 to obtain sufficient generating airflow Q also in the field shown with Curve C. Therefore, conventionally, the dimension L of one side given up is 60mm or less, and the thickness dimension D can standardize even the fan for supplied airs 20mm or less.

[0036]

[Effect of the Invention] As stated above, even when the dimension L of one side conventionally made into the limitation of an axial flow fan is small set as 50mm or less according to this invention, sufficient airflow can be secured and the fan for [which is constituted flatly] the supplied airs which can carry out things and can moreover be attached without an exclusive fixing metal in various devices can be offered.

[0037]

[Translation done.]

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TECHNICAL FIELD

[Industrial Application] This invention relates to the small fan equipment for supplied air used in order to start the fan equipment for supplied air, especially to be built in small electronic equipment, and to carry out inhalation of air or exhaust air to dedication or to perform inhalation of air and exhaust air to coincidence.

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PRIOR ART

[Description of the Prior Art] The fan for supplied airs for conventionally preventing the superfluous temperature rise of the electrical and electric equipment and electronic parts which it comes to prepare in various kinds of electrical and electric equipment, and are built in it is used. As a typical thing of such a fan for supplied airs, the thing of the format called an axial flow fan is known.

[0003] For example, the fan rotor which prepared in one the permanent magnet by which multi-electrode magnetization was carried out with the fan wing in the central part of the body which is constituted in the shape of [flat] a square according to the direct-current axial flow fan proposed in JP,2-142960,U is supported free [rotation], the stator which generates rotating magnetic field is prepared in the body side, and what detects the rotation condition of Rota in the state of non-contact, and performs the roll control of a fan rotor is known. On the other hand, the permanent magnet is fixed in the periphery part of a fan rotor, and the axial flow fan of the periphery drive format of preparing the stator which generates rotating magnetic field around it is indicated in JP,6-46224,Y.

[0004] As the relation between the dimension L of one side which makes the body appearance of each above-mentioned axial flow fan, the thickness dimension D, and the generating airflow Q is shown in drawing 10, it is known that the relation between a dimension and airflow is the relation of abbreviation direct proportion. In this Fig., by 120mm, even that whose thickness dimension D the dimension L of a thing to the side whose thickness dimension D is 25mm is about 20mm in 60mm is standardized, and the dimension L of one side of a body is produced. moreover, abbreviation that generating airflow Q is indicated to be in a straight line A — when this relation is extended further, for example, the dimension L of one side sets it as 50mm as shown by the broken line B since it had become linear relation, it is also known that airflow will become "zero." That is, since the area for preparing the wing of a fan rotor by making it small as a limit on the structure of an axial flow fan will be checked by the area which a permanent magnet occupies and it becomes impossible to secure airflow, 50mm order is made into the limitation for the dimension L of one side.

[0005] So, when the dimension L of one side must be set up from the limit on sizing built in etc. still smaller than 50mm, adoption of the axial flow fan equipped with the advantage of being able to constitute flatly as mentioned above is given up, for example, a fan object is directly fixed to the output shaft of a small direct-current motor, the fan for supplied airs is constituted, and the curve C in drawing 10 is made to resemble as much as possible, and is made and coped with.

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EFFECT OF THE INVENTION

[Effect of the Invention] As stated above, even when the dimension L of one side conventionally made into the limitation of an axial flow fan is small set as 50mm or less according to this invention, sufficient airflow can be secured and the fan for [which is constituted flatly] the supplied air which can carry out things and can moreover be attached without an exclusive fixing metal in various devices can be offered.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, when a fan object was directly fixed to the output shaft of a small direct-current motor and the fan for supplied airs was constituted as mentioned above, there were a trouble which the thickness dimension determined from the overall-length dimension of a DC motor increases, and a trouble that the fixing metal of dedication etc. was needed. Moreover, according to the axial flow fan of the above-mentioned periphery drive format, when it miniaturized, there was a trouble which cannot perform reservation of sufficient airflow Q from the ability of wing area not to be set up greatly.

[0007] Therefore, the place which this invention is made in view of each trouble mentioned above, and is made into the purpose Even if it is the case where the dimension L of one side conventionally made into the limitation of an axial flow fan is small set as 50mm or less As sufficient airflow can be secured, and it can constitute flatly and anchoring to various devices is moreover enabled [having no exclusive fixing metal and], it is in offer of the conventional axial flow fan and the fan for supplied airs who can treat like abbreviation.

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MEANS

[Means for Solving the Problem] In order to solve an above-mentioned technical problem and to attain the purpose, according to this invention, it is fan equipment for supplied airs which comes in one to annex the 1st wing object and the 2nd wing object by which a continuation rotation drive is carried out. The support section supported for said 1st wing object and said 2nd wing object, enabling free rotation. The fan body section which has the 1st opening which carried out opening in the direction order part of a supplied air of each of said wing object, respectively, and the 2nd opening. While being formed in the shape of a circular ring from the periphery part of two or more wing sections formed towards an outside from the center-of-rotation shaft supported to revolve by said support section, and this wing section The 1st [said] wing object which is divided into plurality with equiangular and formed in a radial direction from the multi-electrode permanent magnet magnetized by changing a polarity mutually, and said 2nd wing object, the tangential direction of the peripheral face of said 1st wing object, and the peripheral face of said 2nd wing object — ***** — it is characterized by providing a field generating means by which the direction of a generating field changes like.

[0009] Moreover, the support section which is fan equipment for supplied airs which it comes to annex in one, and supports the 1st wing object and the 2nd wing object by which a continuation rotation drive is carried out for said 1st wing object and said 2nd wing object, enabling free rotation. The fan body section which has the 1st opening which carried out opening in the direction order part of a supplied air of each of said wing object, respectively, and the 2nd opening. While being formed in the shape of a circular ring from the periphery part of two or more wing sections formed towards an outside from the center-of-rotation shaft supported to revolve by said support section, and this wing section The 1st [said] wing object which is divided into plurality with abbreviation equiangular and formed in a radial direction from the multi-electrode permanent magnet magnetized by changing a polarity mutually, and said 2nd wing object, the tangential direction of the peripheral face of said 1st wing object, and the peripheral face of said 2nd wing object — ***** , while a part for a pair is arranged in the vertical part of the core of said fan body section like The field generating means arranged so that the direction of a generating field might change with the period for said continuation rotation drive and might make the electrical angle of 90 degrees mutually. In order to detect the rotation condition of said 1st wing object or said 2nd wing object, the electrical degree between said field generating means is characterized by providing the detection means arranged by the relation which is 90 degrees.

[0010] Moreover, it is characterized by the direction of a generating field equipping further the tangential direction of the peripheral face of said 1st wing object, and the peripheral face of said 2nd wing object with an auxiliary field generating means to change with the period for said continuation rotation drive, with *****.

[0011] Moreover, the support section which is fan equipment for supplied airs which it comes to annex in one, and supports the 1st wing object and the 2nd wing object by which a continuation rotation drive is carried out for said 1st wing object and said 2nd wing object, enabling free rotation. The fan body section which has the 1st opening which carried out opening in the direction order part of a supplied air of each of said wing object, respectively, and the 2nd opening. While being formed in the shape of a circular ring from the periphery part of two or more wing sections formed towards an outside from the center-of-rotation shaft supported to revolve by said support section, and this wing section While being quadrisected at 90 include angles, being inserted into the 1st [said] wing object formed from the multi-electrode permanent magnet magnetized by changing a polarity mutually, said 2nd wing object, said 1st wing object, and said 2nd wing object and being arranged in a radial direction It is characterized by providing the field generating means connected to the field switch circuit which changes with the period for said continuation rotation drive in the direction of a generating field.

[0012] And said 1st wing object and said 2nd wing object are characterized by being set as the wing configuration for performing only only for inhalation of air, for exhaust air or inhalation of air, and exhaust air to coincidence, respectively.

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OPERATION

[Function] While the 1st wing object and the 2nd wing object are supported to revolve free [continuation rotation] in the above configuration in the fan body section which has the 1st opening and 2nd opening the tangential direction of the multi-electrode permanent magnet which was divided into plurality with equiangular in each wing object, and was magnetized by the radial direction by changing a polarity mutually — ***** — the direction of a generating field of a field generating means changes like, and it works so that the 1st wing object and the 2nd wing object may carry out continuation rotation.

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EXAMPLE

[Example] Hereafter, each example of this invention is explained with reference to an attached drawing. First, drawing 1 is the front view having fractured and shown the important section of the supplied-air fan of the 1st example. Moreover, drawing 2 is the central sectional view of drawing 1.

[0015] In both drawings, the fan for supplied air makes it the focus on the greatest structure to annex like illustration of the 1st wing object 4 and the 2nd wing object 5 by which a continuation rotation drive is carried out. Even if it is the case where set the dimension L of the horizontal side as 50mm or less small like illustration, and carried out the height dimension before and after 25mm, and it constitutes very small, sufficient airflow can be secured, and the thickness dimension D is constituted small, and it enables it to constitute flatly. And it is constituted so that anchoring to various devices may be enabled in the thing which was prepared in four corners of the base 1 and which attach, and uses hole 1a, for example, inserts in and carries out the screw stop of the screw to anchoring hole 1a. In this case, you may make it attach through the fittings of dedication from relation with the equipment attached. Moreover, it is constituted also so that inhalation of air and exhaust air can be performed in one set, as obtain the airflow of desired inhalation of air and exhaust air as two or more set minutes of several are prepared adjacently, or inhalation of air is made to carry out to the 1st wing object 4 and it exhausts with the 2nd wing object 5 again.

[0016] Now, the 1st opening 2 and 2nd opening 3 are formed in the base 1 which consists of a predetermined resin ingredient or a predetermined metallic material like illustration, respectively, and he is trying to pass the wind generated by rotation without resistance in the predetermined direction. On the other hand, by setting at least to the core of each of these openings 2 and 3, in order to obtain a secretary location, while supporting the 1st wing object 4 and the 2nd wing object 5 free [rotation with a low load] The pivot bearing 7 for receiving thrust loading generated at the time of rotation is formed at least in the core of the supporter 6 installed from the base 1 by the shape of a cross (it may not be limited to this but a single character thru/or piece support are sufficient), respectively.

[0017] On the other hand, the 1st wing object 4 and the 2nd wing object 5 which are supported to revolve by such pivot bearing 7 While injection formation etc. is really carried out from Sadashige Tokoro fat thru/or a permanent magnet, or a plastics magnet or fixing a wing to a permanent magnet so that it may mention later It is constituted so that the vertical part of the metal medial-axis object 10 established by insert molding in the core of each wing object may be supported free [rotation] by the above-mentioned pivot bearing 7.

[0018] Thus, while each wing objects 4 and 5 supported are formed in the shape of a circular ring from the periphery part of two or more wing sections 9 formed towards an outside from the medial-axis object 10 used as a center-of-rotation shaft, and these wing sections 9 It is quadrisectioned at 90 equiangular degrees and the magnetic pole sections 8a, 8b, 8c, and 8d consist of multi-electrode permanent magnets 8 magnetized by the radial direction by changing a polarity mutually like illustration. After each of these wing objects 4 and 5 really carry out resin shaping of all the wing sections 9 and polarization permanent magnets 8 using the so-called plastics magnet ingredient which mixed in resin the rare earth metal detailed object used briskly in recent years, they can be cheap and, moreover, can obtain the finished product of a high precision because it is made to magnetize a request.

[0019] In a fixed halt location, it can always be stopped now by the 1st wing object 4 and the 2nd wing object 5 which are supported to revolve with the base 1 as mentioned above on the other hand, and they can be made to act on the magnetic pole section of a request of a field certainly in a quiescent state, in the case of starting, as a result of being stabilized in the condition that 8d of mutual magnetic pole sections is attracted.

[0020] Then, along the tangential direction of the peripheral face of the 1st wing object 4, and the peripheral face of the 2nd wing object 5, the 1st coil 11 and 2nd coil 12 from which the direction of a generating field changes in the vertical part of the base 1 are arranged so that the tip may make 90 electrical angles mutually. Moreover, while the magnetometric sensor 13 with which the electrical degree made with coils 11 and 12 [near the 1st wing object 4] consists of a hall device in the location which becomes 90 degrees is arranged like illustration and changing magnetic pole sections [accompanying rotation / 8a 8b, 8c, and 8d] magnetic variation into the electrical signal of an on-off signal, he is trying to tell a signal to a drive circuit.

[0021] Drawing 3 is a circuit diagram changed as the direction of a generating field shows the 1st above-mentioned coil 11 and 2nd above-mentioned coil 12 to drawing 1. First, in drawing 3 (a), a coil 11 and 12 comrades are connected to the serial like illustration. While connecting each lead wire to the collector side of a transistor, DC power supply Vcc (for example, plus side with a direct current voltage of 5 volts) are connected to an emitter side. It is made to switch a magnetic pole by turning on and off the base electrical potential difference of each transistor, and energizing the desired current i1 and i2 in each coils 11 and 12 according to turning on and off of a magnetometric sensor 13. Moreover, in drawing 3 (b), while connecting the base side of each transistor to a magnetometric sensor 13, respectively, each coils 11 and 12 are connected to the emitter side of a transistor, and it is made to switch a magnetic pole by turning on and off the base electrical potential difference of each transistor, and energizing the desired current i1 and i2 in each coils 11 and 12 according to turning on and off of a magnetometric sensor 13.

[0022] By switching S in a coil end as the polarity N which are each coils 11 and 12 as mentioned above, to a tangential direction, sequential suction repulsion is carried out, the magnetic pole sections 8a, 8b, 8c, and 8d of each wing objects 4 and 5 rotate, in the balance condition of the load at the time of airflow generating, rotation is stabilized and a continuation drive is carried out.

[0023] even if it is the case where the dimension L of one side must be set up from the limit on sizing built in as mentioned above etc. still smaller than 50mm — the conventional axial flow fan and abbreviation — the same — it is employable by the mechanical and electric specification.

[0024] Next, drawing 4 is the front view having shown the modification of the 1st example of drawing 1, and if it gives the same sign to a configuration of finishing [explanation] already and explanation is omitted, it will be set to this Fig. Further, in the edge, coils 21, 22, 23, and 24 are arranged in about 4 of the base 1 corners by the 1st above-mentioned coil 11 and the 2nd above-mentioned coil 12, respectively so that an electrical angle may become 90 degrees. It is made to switch a magnetic pole to the longitudinal direction of each coil by energizing in each coil.

[0025] As a result of each coils' 21, 22, 23, and 24 acting auxiliary magnetic attraction and magnetic repulsion by constituting as mentioned above to the magnetic pole sections 8a, 8b, 8c, and 8d of the wing objects 4 and 5, a rotation drive is carried out more smoothly, in the balance condition of the load at the time of airflow generating, rotation will be stabilized and a continuation drive will be carried out.

[0026] And it is made to switch a magnetic pole to the longitudinal direction of each coil by replacing with the 1st above-mentioned coil 11 and the 2nd coil 12 in drawing 5, if the same sign is given to a configuration of finishing [are the front view in which drawing 5 showed the 2nd example, and / explanation] already and explanation is omitted, arranging coils 21, 22, 23, and 24 in about 4 of the base 1 corners respectively and auxiliary, and energizing in each coil.

[0027] In this configuration, sequential suction repulsion is carried out, a rotation drive is carried out so that the magnetic pole sections 8a, 8b, 8c, and 8d of each wing objects 4 and 5 may meet in the direction of an abbreviation normal, in the balance condition of the load at the time of airflow generating, rotation will be stabilized and a continuation drive will be carried out. By constituting as mentioned above, improvement in driving torque, the stability at the time of rotation, and rotational high-speed-ization can be improved further.

[0028] Drawing 6 is the front view having shown the 3rd example, gives the same sign to a configuration of finishing [explanation] already, and omits explanation. In this Fig., it replaces with the 1st above-mentioned coil 11 and the 2nd above-mentioned coil 12 in each example, and the main coil 15 of the projection-on flat surface configuration of the shape of a hard drum like illustration is arranged in the center position of each wing objects 4 and 5. Moreover, the pins 30 and 31 which consist of a magnetic material are arranged in the inner skin part of the openings 2 and 3 of the base 1, and it is constituted so that the initial-valve-position arrangement at the time of quiescence of each wing objects 4 and 5 may be performed from a field unbalance condition.

[0029] Moreover, as shown in drawing 7, after a drive circuit carries out dividing of the periodic signal from the oscillator which consists of Xtal or an easy LCR circuit with a counting-down circuit and acquires a desired drive wave, it is constituted so that the direction of a generating field may change in a main coil 15.

[0030] In this Fig., while connecting each lead wire of a main coil 15 to the collector side of Transistors TA and TB, DC power supply Vcc (for example, plus side with a direct current-voltage of 5 volts) are connected to an emitter side. Moreover, another side is directly connected to the counting-down circuit for one side by the base side through the inverter again, respectively.

[0031] In the above configuration, it is made to switch a magnetic pole by turning on and off the base electrical potential difference of each transistor, and energizing the desired current i1 and i2 to a main coil 15 according to turning on and off of a driving signal by which dividing was carried out with the counting-down circuit.

[0032] By switching a magnetic pole, the operating state Fig. shown in drawing 8 is obtained by energizing to a main coil 15 as mentioned above.

[0033] Sequential suction repulsion is carried out, a rotation drive is carried out synchronous so that the magnetic pole section of each wing objects 4 and 5 may meet in the direction of an abbreviation normal in this Fig., in the balance condition of the load at the time of airflow generating, rotation will be stabilized and a continuation drive will be carried out.

[0034] Drawing 9 is the external view having shown the example of a busy condition, and enables [having no exclusive fixing metal and] anchoring to various devices in (a) by inserting a screw in anchoring hole 1a, and carrying out a screw stop to a device 100. Moreover, it is constituted so that inhalation of air and exhaust air can be performed in one set, as inhalation of air is made to carry out to the 1st wing object 4 and it exhausts with the 2nd wing object 5 again. Moreover, in (b), the ventilating hole 101 is drilled by the device 100 and it is made to exhaust by making only desired inhalation of air perform, as two or more set minutes of several are prepared adjacently from the ventilating hole 101.

[0035] By constituting the fan for supplied airs as mentioned above, it becomes possible in the related Fig. of drawing 10 to obtain sufficient generating airflow Q also in the field shown with Curve C. Therefore, conventionally, the dimension L of one side given up is 60mm or less, and the thickness dimension D can standardize even the fan for supplied airs 20mm or less.

*** NOTICES ***

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the top view of the fan for supplied airs of the 1st example.

[Drawing 2] It is the central sectional view of drawing 1.

[Drawing 3] It is the drive circuit diagram of the fan for supplied airs of the 1st example.

[Drawing 4] It is the top view of the modification of the fan for supplied airs of the 1st example.

[Drawing 5] It is the top view of the fan for supplied airs of the 2nd example.

[Drawing 6] It is the top view of the fan for supplied airs of the 3rd example.

[Drawing 7] It is the drive circuit diagram of the fan for supplied airs of the 3rd example.

[Drawing 8] It is the top view of explanation of the fan for supplied airs of the 3rd example of operation.

[Drawing 9] It is the external view of the example of use of the fan for supplied airs.

[Drawing 10] It is the related Fig. of the dimension L of an axial flow fan, the thickness dimension D, and the generating airflow Q.

[Description of Notations]

1 Base

2 1st Opening

3 2nd Opening

4 1st Wing Object

5 2nd Wing Object

6 Supporter

7 Pivot Bearing

8 Polarization Permanent Magnet

9 Wing Section

10 Medial-Axis Object

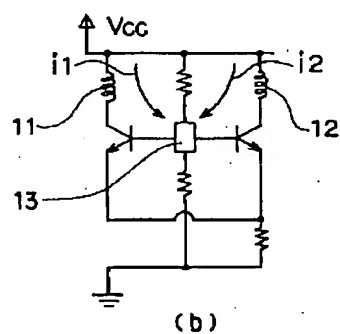
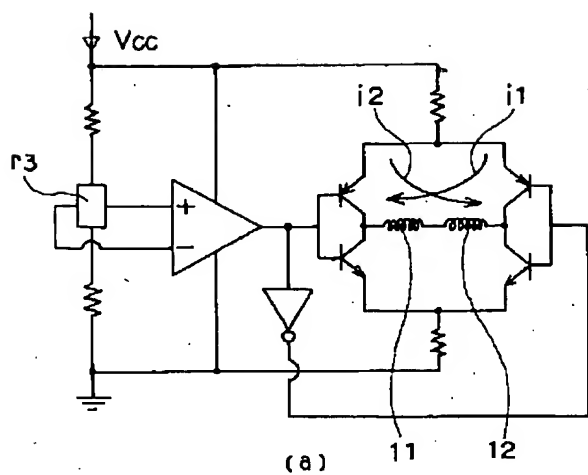
11 1st Coil

12 2nd Coil

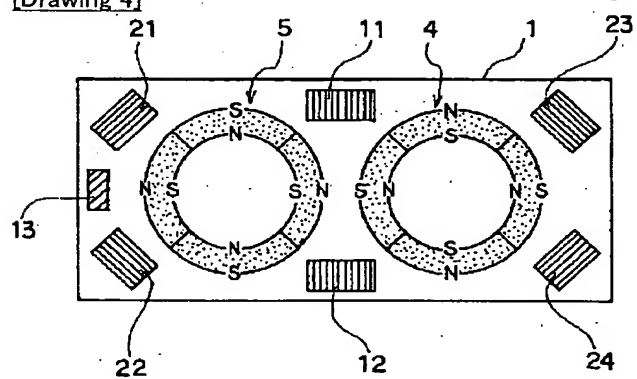
13 Magnetometric Sensor

15 Main Coil

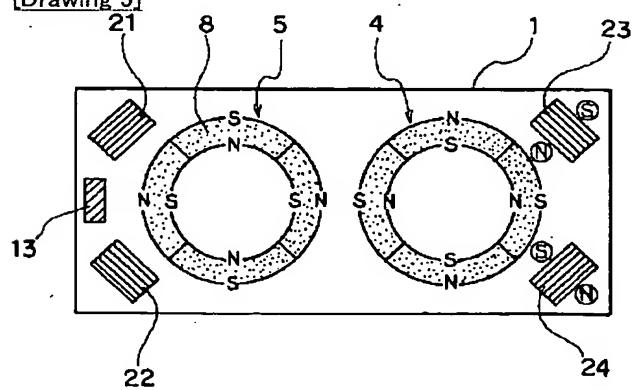
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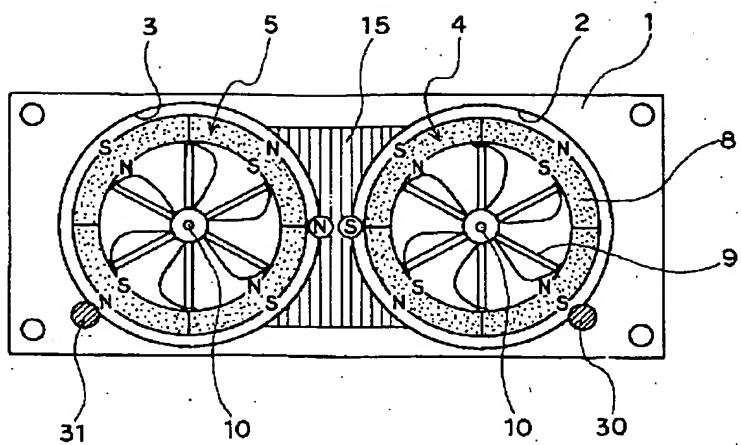
[Drawing 4]



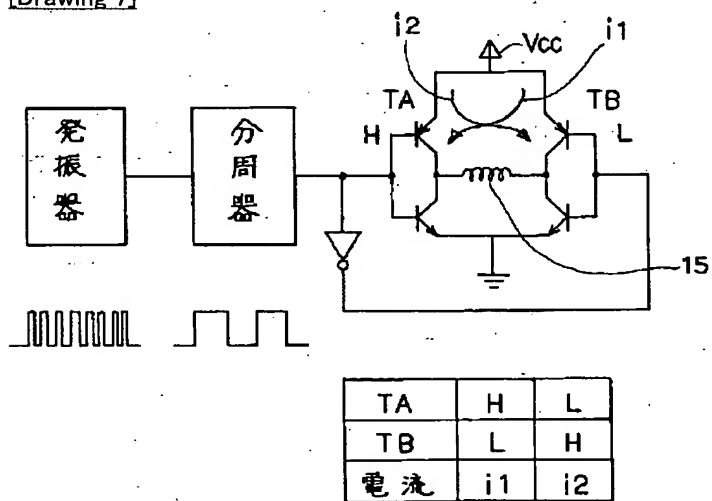
[Drawing 5]



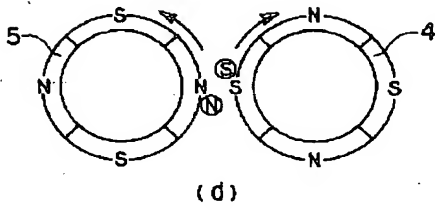
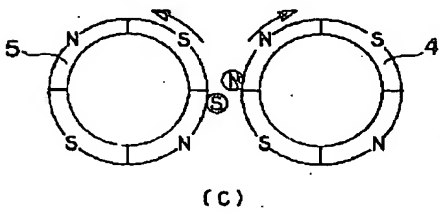
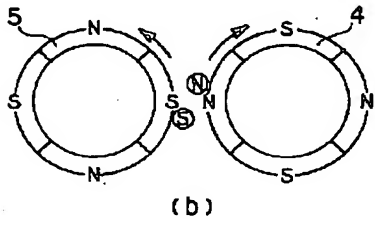
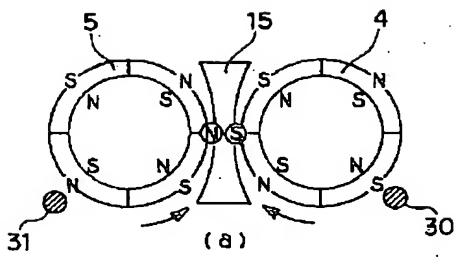
[Drawing 6]



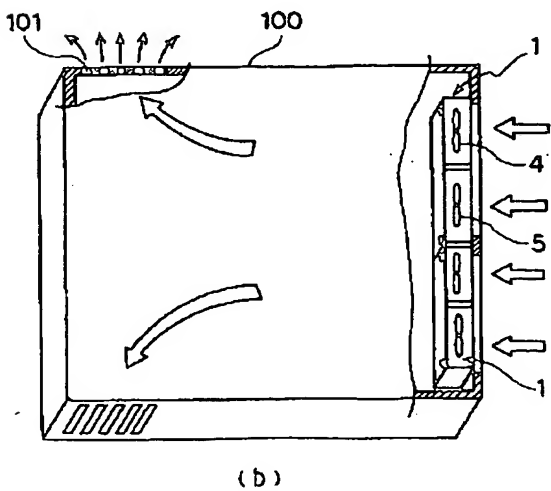
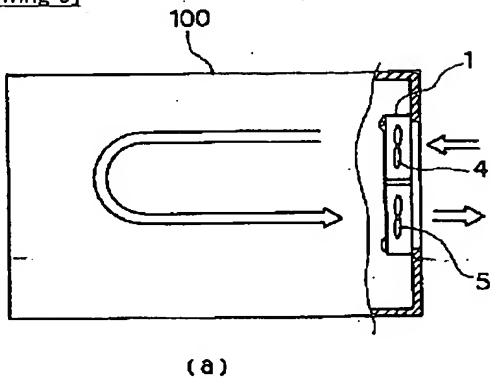
[Drawing 7]



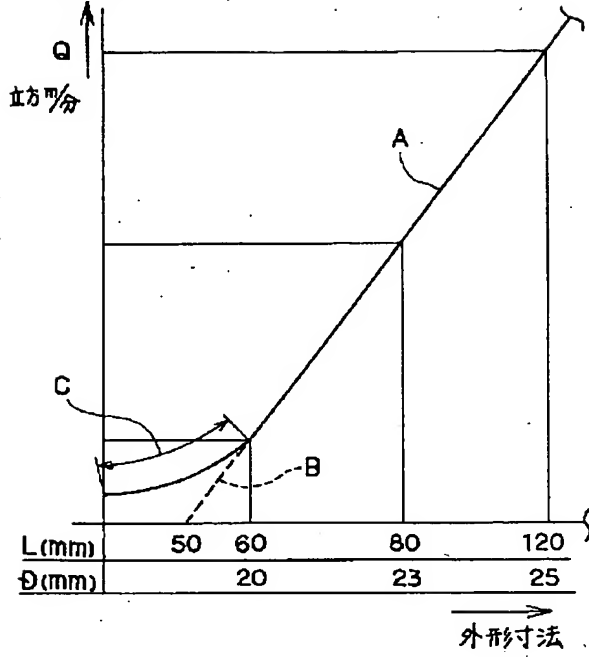
[Drawing 8]



[Drawing 9]



[Drawing 10]



[Translation done.]